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**JUNE 1990 MONTHLY
GROUND WATER SAMPLING RESULTS
LIVINGSTON RAIL YARD
LIVINGSTON, MONTANA**

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**JUNE 1990 MONTHLY
GROUND WATER SAMPLING RESULTS
LIVINGSTON RAIL YARD
LIVINGSTON, MONTANA**

Submitted to:

**Montana Department of Health
and Environmental Sciences**
Cogswell Building
Helena, Montana 59620

Submitted by:

Burlington Northern Railroad
9401 Indian Creek Parkway
Overland Park, Kansas 66201

Prepared by:

Envirocon, Inc.
101 International Way
P.O. Box 8243
Missoula, Montana 59807

Submittal Date:

October 2, 1990



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1.0 INTRODUCTION

Burlington Northern Railroad (BNRR), through its contractor Envirocon, Inc. (Envirocon), took 15 ground water samples on and between June 25 and 27, 1990. Twelve samples were taken from ten monitoring wells on and around the Livingston rail yard and one each was taken from the B and D Street Municipal Water Wells in the city of Livingston, Montana. Two samples were field duplicates and one was a trip blank.

Energy Laboratories, Inc., of Billings, Montana, analyzed all the samples for purgeable organic compounds (POXs) by EPA Method 601. Table 1.0 summarizes the sample and well numbers, the sampling methods, sampling dates, and the analytical methods. Figure 1.0 shows the well locations and summarized analytical results. Appendix A contains the complete laboratory analytical results.

2.0 RESULTS AND INTERPRETATIONS

The analytical results from most locations of the June sampling round are consistent with previous monthly results. Notable changes in chlorinated compound concentrations occurred at Wells L-88-10, LS-8, and LS-4. The analytical results from these wells and the B and D Street Municipal Wells are discussed below. A more complete interpretation of monthly and seasonal variations in chlorinated compound concentrations will be presented in the Remedial Investigation Report - Ground Water and in the August 1990 Quarterly Ground Water Sampling Results Report.

The analytical results from Well L-88-10 show a decrease in the concentration of chlorobenzene from 18 parts per billion (ppb) in May 1990 to 5.6 ppb in June 1990. This drop is consistent with concentration trends

TABLE 1.0
CORRELATION OF WELL AND SAMPLE NUMBERS
JUNE 1990

SAMPLE NUMBER	WELL NUMBER	SAMPLE METHOD	SAMPLE DATE	ANALYTICAL METHOD*
140101-455	Trip Blank	-	6/25/90	601
140101-456	B Street	Tap	6/26/90	601
140101-457	D Street	Tap	6/25/90	601
140101-457A	90-3	DBP	6/26/90	601
140101-458	89-4	DBP	6/26/90	601
140101-459	LS-6	DBP	6/25/90	601
140101-455	Dup. of LS-6	DBP	6/25/90	601
140101-461	7	DBP	6/25/90	601
140101-462	89-2	DBP	6/25/90	601
140101-463	LS-11	DBP	6/26/90	601
140101-464	LS-8	DBP	6/26/90	601
140101-465	89-9	DBP	6/26/90	601
140101-456	L-87-2	DBP	6/27/90	601
140101-467	Dup. of L-87-2	DBP	6/27/90	601
140101-468	L-88-10	DBP	6/27/90	601

NOTES: * Refers to EPA analytical method
DBP - Dedicated bladder pump

noted at this well during 1989 and may be due to seasonal fluctuations in the volume of water in the aquifer and in the direction of ground water flow.

The analytical results from Wells LS-8 and LS-11 also show a decrease in the concentration of chlorobenzene from May to June 1990. In Well LS-8 the concentration dropped from 30 ppb to 9.3 ppb and in Well LS-11 the concentration dropped from 7.1 ppb to <1.0 ppb. These changes in chlorobenzene concentration may be due to seasonal variation in the volume of water in the aquifer and in the direction of ground water flow.

The analytical results from the B and D Street Municipal Wells show no detectable concentrations of POXs. This is consistent with previous monthly and quarterly analytical results.

3.0 QA/QC RESULTS

Envirocon followed the Quality Assurance/Quality Control (QA/QC) Program, outlined in the Interim Remedial Measures Work Plan (IRMWP), during the June 1990 sampling round. The trip blank analytical results show no detectable concentrations of any Method 601 analytes, as shown in Appendix A. The analytical results of the field duplicates from Wells LS-6 and L-87-2 closely match the results of the two original samples, as shown in Appendix A and on Figure 1.0.





APPENDIX A

LABORATORY RESULTS

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-873-5227ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.

SAMPLE IDENTIFICATION

SAMPLE SUBMITTED

DATE REPORTED

TRIP
BLANK
90-17342
140101-455
06/28/90
07/18/90B Street
90-17343
140101-456
06/28/90
07/18/90D Street
90-17344
140101-457
06/28/90
07/18/90

CONSTITUENT

ug/l

ug/l

ug/l

Purgeable Organics
(EPA Method 601)

Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethane	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	<0.50	<0.50	<0.50
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

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ENERGY LABORATORIES, INC.

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FAX (406) 252-6069 • 1-800-873-5227

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-17345	90-17346	90-17347
SAMPLE IDENTIFICATION	140101-457A	140101-458	140101-459
SAMPLE SUBMITTED	06/28/90	06/28/90	06/28/90
DATE REPORTED	07/18/90	07/18/90	07/18/90

CONSTITUENT	ug/l	ug/l	ug/l
Purgeable Organics (EPA Method 601)			
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	48	4.8	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethane	85	370	<0.50
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	9.6	3.5	<0.50
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

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ENERGY LABORATORIES, INC.

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FAX (406) 252-6069 • 1-800-873-5227

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-17348	90-17349	90-17350
SAMPLE IDENTIFICATION	140101-460	140101-461	140101-462
SAMPLE SUBMITTED	06/28/90	06/28/90	06/28/90
DATE REPORTED	07/18/90	07/18/90	07/18/90

CONSTITUENT	ug/l	ug/l	ug/l
Purgeable Organics (EPA Method 601)			
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethane	<0.50	2.5	<0.50
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	<0.50	<0.50	<0.50
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

	Duplicate
LAB NO.	90-17350
SAMPLE IDENTIFICATION	140101-462
SAMPLE SUBMITTED	06/28/90
DATE REPORTED	07/18/90

CONSTITUENT	ug/l
Purgeable Organics (EPA Method 601)	

Bromodichloromethane	<1.0
Bromoform	<1.0
Bromomethane	<1.0
Carbon tetrachloride	<0.50
Chlorobenzene	<1.0
Chloroethane	<1.0
2-Chloroethylvinyl ether	<1.0
2-Chlorotoluene	<1.0
Chloroform	<1.0
Chloromethane	<1.0
Dibromochloromethane	<1.0
1,2-Dichlorobenzene	<1.0
1,3-Dichlorobenzene	<1.0
1,4-Dichlorobenzene	<0.50
1,1-Dichloroethane	<1.0
1,2-Dichloroethane	<0.50
1,1-Dichloroethene	<0.50
cis-1,2-Dichloroethene	<1.0
trans-1,2-Dichloroethene	<1.0
1,2-Dichloropropane	<1.0
cis-1,3-Dichloropropene	<1.0
trans-1,3-Dichloropropene	<1.0
Methylene chloride	<1.0
1,1,2,2-Tetrachloroethane	<1.0
Tetrachloroethane	<0.50
1,1,1-Trichloroethane	<0.50
1,1,2-Trichloroethane	<1.0
Trichloroethene	<0.50
Trichlorofluoromethane	<1.0
Vinyl chloride	<0.50
Dichlorodifluoromethane	<1.0

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-17351	90-17352	90-17353
SAMPLE IDENTIFICATION	140101-463	140101-464	140101-465
SAMPLE SUBMITTED	06/28/90	06/28/90	06/28/90
DATE REPORTED	07/18/90	07/18/90	07/18/90
CONSTITUENT	ug/l	ug/l	ug/l
Purgeable Organics (EPA Method 601)			
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	9.3	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	1.4	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	76	87	2.2
trans-1,2-Dichloroethene	<1.0	1.3	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethane	99	112	400
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	14	17	9.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-17354	90-17355	90-17356
SAMPLE IDENTIFICATION	140101-466	140101-467	140101-468
SAMPLE SUBMITTED	06/28/90	06/28/90	06/28/90
DATE REPORTED	07/18/90	07/18/90	07/18/90

CONSTITUENT	ug/l	ug/l	ug/l
Purgeable Organics (EPA Method 601)			

Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	124	119	5.6
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	71	70	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	3.1	3.3	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	3.3	3.3	0.85
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	860	830	230
trans-1,2-Dichloroethene	19	18	2.5
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethane	2.0	1.5	112
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	19	19	22
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	1.2	1.1	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

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